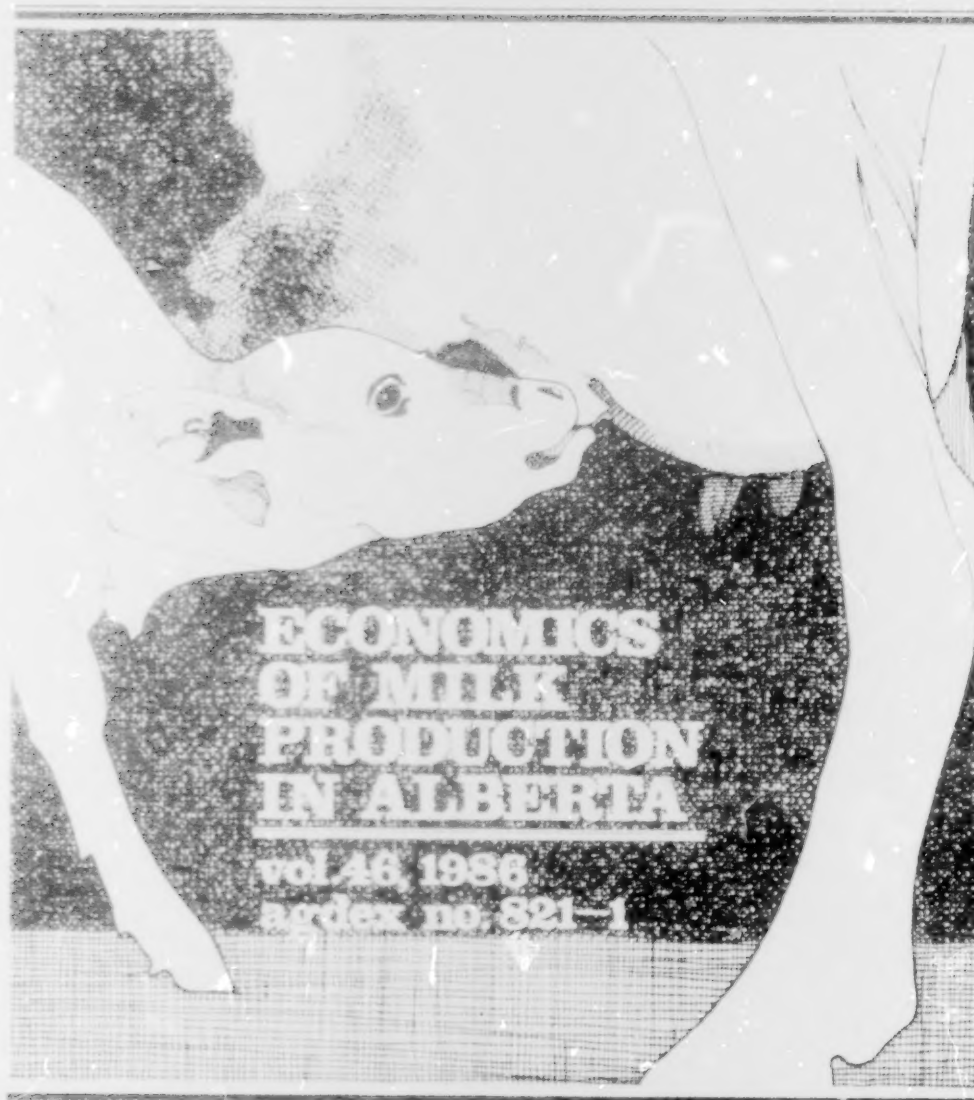




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ECONOMICS OF MILK PRODUCTION
IN ALBERTA, 1986

Volume 46

By
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Economic Services Division
Alberta Department of Agriculture
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FOREWORD

Pricing of fluid milk in Alberta is regulated by the Public Utilities Board (PUB). The Production and Resource Economics Branch conducts an annual study of dairy production costs and returns in Alberta to assist the PUB in administering fluid milk prices. This annual Dairy Cost Study was introduced during World War II and is now recognized by dairymen, consumers and the PUB as the primary reference for setting fluid milk prices.

In addition to the Dairy Cost Study, the branch has developed a computerized formula which monthly monitors producer costs. The formula enables the PUB to make more frequent adjustments to the producer price in response to changes in production costs during the year. Further adjustment to the producer price can be made when the annual Dairy Cost Study is completed.

The 1986 cost of producing fluid milk dropped by 7.8 per cent from 1985. The decline was mainly attributed to falling feed prices. The decline in feed cost, combined with short term government drought assistance greatly improved net returns to producers. Return to equity rose to 16.5 per cent from 12.9 per cent in 1985.

Dr. Carlyle Ross, Head
Production & Resource Economics Branch

NOTE

This report was prepared from farm records of a selected number of fluid milk producers in Alberta who voluntarily participated in this project. Their participation was greatly encouraged by the Alberta Fluid Milk Producers' Association. The Alberta Dairy Control Board provided the financial compensation to the participating producers. Allan Presiznuk from Production and Resource Economics Branch collected and assisted with the computerization of the farm data and has maintained personal contact with the producers throughout the year.

Rudy Susko

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I. INTRODUCTION

This study is an annual economic analysis of milk production on Alberta farms. Prior to 1974 the findings of these studies were used as the documented evidence at the Public Utilities Board hearings to set the producer price. Although a formula pricing system was adopted in November 1974 the significance of this study in overall pricing mechanism, remains undiminished.

More specifically the objectives of the study are:

- to provide a continuing account of the costs and economic conditions encountered in the production of fluid milk in Alberta.
- to annually monitor the performance of the fluid milk formula pricing.
- to use the findings as a basis for the revision in the formula price.
- to provide the data for the extension use, for example, farm management.
- to provide the participating dairy farmers with a personal business analysis for management purposes.

The cost of production account is a vital economic indicator in milk pricing because of the supply management nature of the industry.

II. METHOD OF ANALYSIS

Many approaches may be used to establish the cost of production on the farm. The approach taken in this study is to show the actual cost outlays taken from the farm records for a given production year. A computer program is utilized to summarize the data and calculate the weighted group averages.

The study emphasizes the overall provincial situation supported by the regional data. Since the study is annual and ongoing, the current year is compared with the previous year to make the results more meaningful. Using this approach, the information is expressed in production units such as per hectolitre of milk and per cow.

Preliminary quarterly analyses are made during the year to observe seasonal effects. However, emphasis is on the full year's operation.

1. Enterprise Identification -- There are many accounting approaches for calculating the farm cost of producing fluid milk. Some use the total farm approach, with dairy costs intermingled with others. Others use the different imputed cost items such as operating interest cost or management charge. In Alberta the dairy enterprise is defined as all activities associated with milking cows, dry cows and young dairy stock. In most cases, the dairy operator raises his own feed; the inputs of production are allocated to the dairy enterprise and the total farm according to the actual use. Consequently, the final costs of producing milk are the true costs associated only with milk production.
2. Inventory Adjustment -- Since the cost of raising young dairy stock is included in the cost of milk production, the total income includes net cattle sales and net inventory increases to show the herd growth. The cattle inventory increases are determined by subtracting the beginning year inventory from the year-end inventory. The gross income is thus composed of milk sales and inventory adjustment. If the inventory adjustment per hectolitre of milk is excluded from the income the result is the blend price and subsidy received for milk.

3. Home Grown Feed -- The hay grown on the farm and fed to dairy livestock is valued at regional values of hay in the stack on the farm; feed grain is valued at elevator prices provided by the Alberta Grain Commission. Although hay and grain could be grown on the same farm, both are considered to be purchased from the crop enterprise. The total value of home grown feed is determined by applying the regional price to the actual quantity fed. The procedure adequately compensates for the production cost of growing home feed. The cost of purchased feed is accepted at the actual value spent each month.
4. Value of Investment and Depreciation -- The cost of production and other relevant data from this report are supposed to reflect the average conditions in the industry. The value of depreciation is based on the original value of buildings and machinery. There is also a need to estimate the current market value of the facility to determine the equity position. The market value is computed from the original value of dairy capital by updating with the inflation factors and then depreciating according to the number of years in use. This value is used for calculating the return to equity. The age of the facility is indicated by the sample of participating producers representing the total industry. The farmland is not considered as a dairy investment. Only the acreage for dairy buildings and corral location is included in the dairy. The dairy livestock inventory is valued at the prevailing market prices at the beginning of the year.
5. Imputed Costs -- There are two basic alternatives to value the economic well being of the farm enterprise. A. to determine the return to family labour including the operator labour input, and B. to determine the return to equity invested in each particular enterprise. The methods, as identified in Table 1, are quite compatible and in each case *some major assumptions* must be made. In alternative A where the residual is return to family labour, the equity interest must be imputed in order to arrive at the total cost of production. The actual residual can then be measured in terms

of dollars per hour of labour. On the other hand, using alternative B, the value of family labour must be imputed since there is usually no value attached to this input.

In this study the principles of the alternative B are used, i.e. the objective is to determine the percentage return to equity. The imputed value of family labour is included in the operating or variable costs. This is more practical for a number of reasons: i) incorporated farms usually allocate total labour expenses including family, ii) in reality the operator is using money during the year for living expenses and thus the imputed family labour value is compensating for this, iii) imputed interest or opportunity cost on equity, used in alternative A is a controversial issue in a period of persistent inflation of capital assets. The charges for rent are included in the cost of capital. The capital cost in this context represents the cost of ownership of resources. If resources are rented there is a charge for their use; on the other hand if resources are owned the owner must bear the cost of depreciation and interest on debt. For group averages such classification of variable (or operating) and capital cost is very suitable.

- a) Operator and family labour: the operator's actual labour may vary from almost nil on some dairy farms to the total input of labour on others. Our procedure has been to obtain a statement of the operator's labour in hours per month, then apply the rate paid for full time dairy labour (including room and board).

In determining the hourly value, 2500 hours is considered to be the working time for one man-equivalent in a 12-month period. By this method, it is felt that the process of valuing the operator's labour is equitable. This method is preferred over leaving it as a residual because of the great variability in labour time between operators. Family labour is evaluated similar to the above, but with different wage rates according to age and working responsibilities.

TABLE 1

ALTERNATIVE RETURNS

A. LABOUR	B. CAPITAL
a) Gross Income	a) Gross Income
Feed	Feed
Other	Other
Hired Labour	Hired Labour
<u> -</u>	<u>Family Labour (imputed)</u>
b) Operating Cost	b) Operating Cost
Rent	Rent
Depreciation	Depreciaton
Paid Interest	Paid Interest
<u>Equity Interest (Imputed)</u>	<u> -</u>
c) Capital Cost	c) Capital Cost
Return to Family Labour	Return to Equity

- b) Interest on Capital: the actual interest paid on existing liabilities is included in the capital cost. To obtain this value, the participating producers were asked to report their outstanding liabilities and the interest rates they paid. This method is more accurate than reporting the annual interest payment sum. The total operating cost, plus the capital cost, account for total enterprise outlays and if subtracted from the gross income, the bottom line residual is the return on equity. The return on equity is not imputed but is left as a residual to measure the economic well-being of a farmer. If this residual is expressed as a percentage of the equity capital, then the actual return on equity could be compared with some alternative opportunity income which could be expected from Canada Savings Bonds or term deposits.

6. The production cost concept: The concept of cost accounting in farming is not the same in all provinces. In Alberta, the following production cost concept is used:

DIAGRAM 1

Farm Sales					Inventory Adjustment	
Gross Income						
Feed Costs	Labour Costs	Other Costs	Rent	Depre- ciation	Interest Paid	
Operating Costs			Capital Costs			Return To Equity
Production Cost						
			Debt Repayment Capacity			

III. DATA COLLECTION

In order to obtain accurate dairy information from primary milk producers, all producers on the study are required to complete a detailed questionnaire of their dairy production activities each month. This questionnaire is shown in Appendix D of this report.

Research assistants collect the data, monitor the monthly collection and audit the data. This procedure ensures promptness in data collection and a minimum of recording error. The information is then entered into the computer. The computer output shown in Appendix A, B and C serves as supporting data for the report.

The analysis is based on data from fluid milk producers. Consequently the results indicate the cost level of producing fluid milk rather than industrial. The cost level for industrial milk might differ from fluid, but the difference is not substantial.

Fifty-six dairy producers across the province submitted business information for the calendar year 1986. Two regions are recognized for the purpose of analysis. The region lying north of 39th township is called Northern Alberta and is represented by 34 producers; the region south of the 39th township is referred to as Southern Alberta and is represented by 22 producers. The producers submitted business accounts throughout the year.

Sample

While the number of participants can change because of unforeseen circumstances, the sample size is determined statistically every year. It was established that the variance of cost of producing milk in the population of fluid milk shippers was \$3.75/hL. The desired variation

was assumed to be 20 cents. The sample size was then determined by the formula.¹

The study was designed to represent a cross-section of the producers by the milk quota size. The provincial fluid milk shippers were arranged according to the quota size from largest to smallest in each of the two regions, Southern Alberta and Northern Alberta. The sample was selected by systematic sampling to provide better representation of the population. The average quota and herd size of the sample was 730 litres and 56 cows respectively. The sample size of 70 producers was determined to be statistically sufficient to represent the total population of fluid milk shippers. Out of that group 56 producers completed reports for the 12-month period needed for the study. Some characteristics of the sample are shown in the following table.

TABLE 2 1986 SAMPLE CHARACTERISTICS

Years in Dairy	Debt/Capital (.3)		Totals	No. of Cows (40)	
	Less	More	(%)	Less	More
	----- percent of the sample -----				
Less than 10	9	30	39	7	32
More than 10	52	9	61	16	45
Totals (%)	61	39	100	23	77

Production Conditions²

The season started with good soil moisture reserves in most Regions. Cool weather in April and a blizzard in early May caused

$$1 \quad n = \frac{4 \times s^2}{L^2} \div \left(1 + \frac{n}{N}\right)$$

Where: n is sample size
N is population size
s is standard deviation of population
L is expected accuracy of sample.

2 As reported by Statistics Branch of Alberta Agriculture.

seeding delays. Precipitation through the growing season was above average and well timed. Only Peace River and the Southern Regions reported any moisture stress during the year. The crops responded to the cool wet weather by producing abundant foliage and maturing slowly. On August 20th a light frost was reported. The first heavy frost occurred on September 7 in the North and Central Regions. Harvesting was getting underway in early September when six consecutive weeks of rainy weather set in. By mid-October it was questionable whether much of the crop would be harvested. In the last two weeks of October the weather changed for the better, providing some of the finest combining conditions ever seen at that time of year. By the time the snow came in early November, 99 per cent of the crop had been harvested.

Green seed caused the downgrading of over 50 per cent of the crop to below No. 1 Canada. For the other crops, the frost did not cause serious damage. However, the rains that occurred through September and to mid-October caused bleaching and sprouting which downgraded more than 90 per cent of the wheat to No. 2 CWRS or lower. The poor quality of the 1986 crop was not welcomed as it reduced value and marketability for the second consecutive year.

Pasture conditions improved greatly over the previous summer. They were in good to excellent condition through most of the 1986 season. At the end of summer the only Region reporting poor conditions was North Eastern Alberta. By fall, fodder and feed grain supplies were in adequate to surplus supply across the province. Hay yields averaged 2.18 tonnes per acre, almost a tonne higher than the previous year. Fall subsoil moisture was at medium to high levels in all areas except the Peace and North Eastern Region. With average snowfall, prospects should be good next spring.

The supplies of forage were adequate to surplus in nearly all locations of the province. The quality of the hay was affected by bad weather. It was generally rated as fair. Feed grains were generally reported to have good quality.

The condition of livestock and adequate feed supplies provide a good situation for wintering cattle in 1986/87.

IV. ANALYSIS OF RESULTS

Income

The program of supply management of fluid milk in Alberta is administered by the Alberta Dairy Control Board. Fluid milk quotas held by the producers are assigned by the Board to the processing plants. The minimum fluid milk prices at farm, wholesale and retail levels are established by an independent Public Utilities Board. (PUB). The PUB uses a fluid milk price formula to establish the monthly farm price. The retail and wholesale prices increased in March 1986 as a result of an application of processors for a price increase. However, this increase was offset during the year by three formula³ price reductions at the producer level. The chronology of the price changes are shown in Table 3.

TABLE 3 FLUID MILK PRICE CHANGES IN 1986

Effective Date	Producer Price \$/hL	Wholesale Price ¢/L	Retail Price ¢/L
December 31, 1985	51.07	81	85
March 1, 1986	51.07	82	88
April 15, 1986	50.09	81	87
October 1, 1986	49.11	80	86
December 1, 1986	48.13	79	85
Average	50.03	80.79	86.46

3 The Alberta milk price formula was first adopted in November 1974; there was a major revision on July 1, 1980. A concise description of the formula is given in the Appendix E.

Fluid milk sales showed only a slight improvement over the previous year. The sales of 258.0 million litres were up from 255.7 million litres in 1985.

The utilization of assigned fluid milk quota in 1986 was 75.5 per cent compared to 75.0 per cent in 1985.

Fluid milk producers shipping milk in excess of designated Class 1 (fluid) milk received a \$6.04 per hectolitre (hL) subsidy if the milk was covered by national market share quota. The subsidy was paid in addition to industrial milk prices. Of this subsidy, the Canadian Dairy Commission (CDC) held back a levy of \$5.14 per hectolitre to pay the support program expenses. In addition to the levy, the CDC continued to impose a 30-cent skim-off levy on fluid milk deliveries.

The over-quota levies collected during the year are usually refunded depending on the provincial quota situation on July 31 (dairy year end). In 1986 the Alberta total deliveries exceeded the MSQ by only 1.56 per cent.

The diagram on the following page summarizes the quantity, price and utilization of milk in Alberta.

Table 5 portrays the cost of producing milk for the dairy enterprise in Alberta; for comparison Tables 6 and 7 display the results of Northern and Southern regions respectively. Gross income is the sum of milk sales and value for inventory adjustment. Although the fluid milk price was reduced three times in 1986, the decreases were somewhat offset by lower levies. The sum of milk subsidies less levies was 34 cents per hectolitre higher in 1986 compared to 1985. Less over-quota levies were paid in 1986. The final blend price of \$45.44 per hectolitre of milk sold increased by 25 cents over the 1985 price. The fluid milk utilization of assigned fluid quota did not play a significant role in reducing the fluid price in 1986.

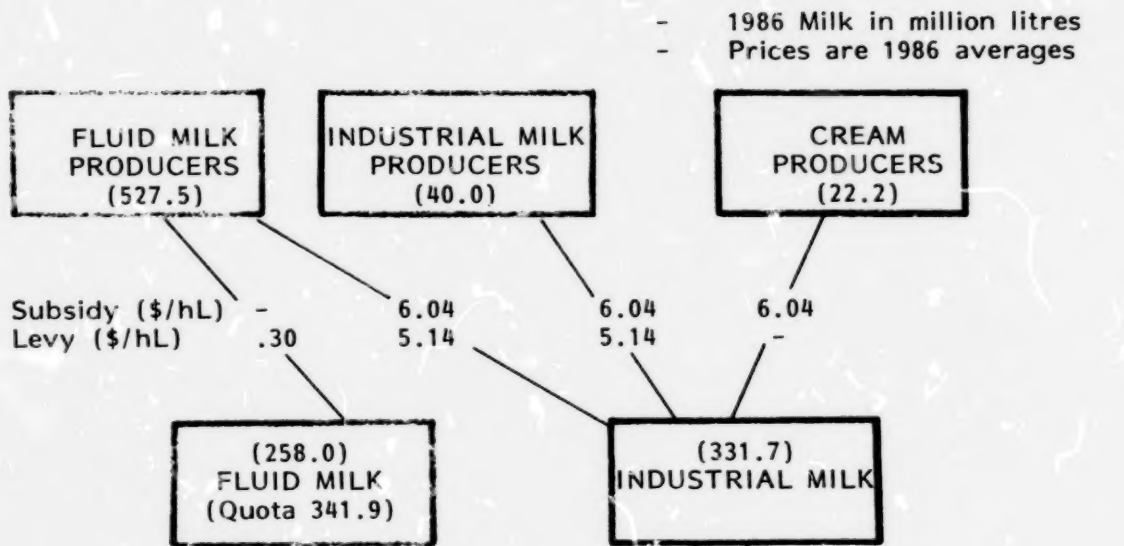
The gains in income per cow were significant in 1986 due to substantial increases in cow productivity from 6282 litres in 1985 to 6671 litres in 1986, a 6.2 per cent gain.

Inventory adjustment or the value for herd growth and credits increased in 1986 by \$39.58 per cow to \$240.65 or 3.72 per hectolitre. Miscellaneous receipts increased substantially in 1986 to \$1.71 per hectolitre from \$0.79 in 1985, mainly because of the effect of the feed

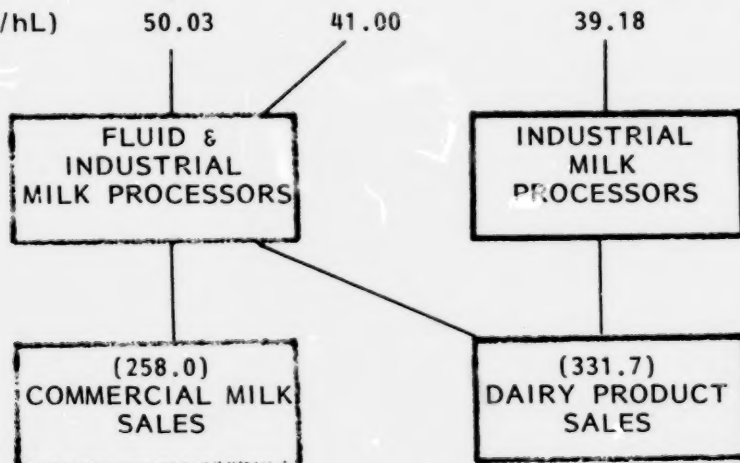
grain market adjustment program as well as drought assistance. Total gross income per hectolitre of milk sold averaged \$49.16, up 1.3 per cent from \$48.52 in 1985.

DIAGRAM 2

FARM
SECTOR



PROCESSING



- Homogenized
- 2%
- Skim Milk
- Buttermilk
- Chocolate Milk
- UHT Milk
- 10% & Whipping Cream
- Eggnog

- Butter
- Powder
- Cheese
- Ice Cream
- Fluid Creams
- Concentrated Products

Production Costs

Table 4 shows the average values of the three most significant inputs; capital, labour and feed.

Investment value per cow increased in the 1986 sample by 9.5 per cent over the previous year, while the indebtedness was reduced from 34 per cent to 27 per cent. Feed prices showed a most significant decline in 1986. The concentrate blend price dropped by 20.7 per cent from the 1985 price. In addition to the decline of grain prices, the \$21.00 feed grain market adjustment program was a contributing factor. The drop in roughage prices was also significant in 1986, the average value for roughage dropped by 19.8 per cent in 1986. The hourly rate paid for hired labour increased by 5.8 per cent in 1986, from \$5.99 to \$6.34.

TABLE 4: INPUT PRICES

	% Use	1985	% Use	1986
		Average Price		Average Price
Depreciable Investment		2650		2958
Livestock Investment		2031		2095
Total Investment	34*	4726	27*	5174
Grain & Concentrate-homegrown	31	109.8	27	61.3
-purchased	69	185.0	73	169.5
Roughage -homegrown	66	88.4	78	72.7
-purchased	34	105.8	22	102.7
Labour -hired	34	5.99	31	6.34
-family	66	7.02	69	7.25

* Debt/capital ratio or per cent indebtedness.

The above input prices, together with the actual use of various inputs, created a basis for the cost of production. The total production cost per hectolitre of milk decreased in 1986 from \$42.78 to \$39.43, a significant 7.8 per cent. While the dairy cash expenses, such as fuel, utilities, medicine, etc. remained almost unchanged at \$10.24 per hectolitre, the feed cost registered the highest decline of 15.9 per cent from \$17.03 per hL to \$14.32. The feed cost in 1986 accounted for a mere 29.1 per cent of income, down from 35.1 per cent a year ago.

Higher labour rates in 1986 were offset by more efficient use of labour, leaving total labour costs almost unchanged, accounting for 17 per cent of income. Lower indebtedness of 1986 sample producers was responsible for lower interest payments. The capital cost was marginally down in 1986.

TABLE 5:

ALBERTA AVERAGE
DAIRY ENTERPRISE COSTS AND RETURNS

	Per hL. Sold	Per Cent From Income	Per hL. Sold	Per Cent From Income
	1985		1986	
INCOME:				
Milk Sales	45.84		45.75	
Milk Subsidy	2.23		2.31	
Milk Levies (-)	-2.88		-2.62	
Miscellaneous Receipts	-.79		1.71	
Net Cattle Sales (+-)	2.99		2.38	
Net Inventory Increase (+-)	-0.45		-0.37	
Gross Income	48.52	100.00	49.16	100.00
EXPENSES:				
Grain	2.11		1.36	
Complete Feed	5.00		4.60	
Supplement	0.30		0.64	
Minerals & Vitamins	0.18		0.25	
Roughage	8.93		7.04	
Pasture	0.46		0.36	
Processing Costs	0.05		0.08	
Total Feed Costs	17.03	35.11	14.32	29.14
Bedding and Supplies	1.30		1.19	
Vet & Medicine	1.16		1.22	
Milk Hauling	2.41		1.62	
Producer's Fees	--		0.80	
Utilities	1.13		1.06	
Fuel, Oil, Lube	0.87		0.57	
Bldg & Mach Repairs	1.79		1.93	
Taxes & Insurance	0.52		0.58	
Miscellaneous	1.11		1.25	
Dairy Cash	10.29	21.21	10.24	20.83
Hired Labour	2.64		2.40	
Family Labour	6.00		6.03	
Total Labour Costs	8.64		8.43	
TOTAL OPERATING COSTS	35.97	17.81	32.99	17.15
Rent	0.40		0.26	
Depreciation	3.95		3.95	
Interest (Cap. Debt)	2.45		2.22	
Total Capital Costs	6.81	14.04	6.44	13.09
TOTAL PRODUCTION COST	42.78	88.17	39.43	80.20
RETURN TO CAPITAL	12.55		16.17	
RETURN TO EQUITY	5.74	11.83	9.73	19.80
MILK PRICE	45.19		45.44	
INVENTORY ADJUSTMENT	3.33		3.72	
INTEREST ON EQUITY (%)	11.04		16.57	
INTEREST ON DEBT (%)	9.35		10.42	

TABLE 6:

NORTHERN ALBERTA AVERAGE
DAIRY ENTERPRISE COSTS AND RETURNS

	Per hL. Sold	Per Cent From Income	Per hL. Sold	Per Cent From Income
	1985		1986	
INCOME:				
Milk Sales	45.82		45.81	
Milk Subsidy	2.29		2.39	
Milk Levies (-)	-2.94		-2.93	
Miscellaneous Receipts	0.68		1.81	
Net Cattle Sales (+-)	2.93		2.50	
Net Inventory Increase (+-)	-0.16		-0.71	
Gross Income	48.62	100.0	48.88	100.0
EXPENSES:				
Grain	1.93		1.37	
Complete Feed	4.55		3.62	
Supplement	0.25		0.88	
Minerals & Vitamins	0.22		0.26	
Roughage	8.05		6.59	
Pasture	0.46		0.39	
Processing Costs	0.06		0.11	
Total Feed Costs	15.52	31.92	13.22	27.04
Bedding and Supplies	1.39		1.21	
Vet & Medicine	1.07		1.19	
Milk Hauling	2.40		1.54	
Producer's Fees	--		0.90	
Utilities	1.23		1.09	
Fuel, Oil, Lube	0.99		0.68	
Bldg & Mach Repairs	1.96		2.18	
Taxes & Insurance	0.59		0.62	
Miscellaneous	1.09		1.07	
Dairy Cash	10.72	22.05	10.47	21.42
Hired Labour	2.61		2.38	
Family Labour	6.81		6.58	
Total Labour Costs	9.42	19.37	8.97	18.35
TOTAL OPERATING COSTS	35.66		32.65	
Rent	0.37		0.35	
Depreciation	4.11		4.09	
Interest (Cap. Debt)	2.34		2.48	
Total Capital Costs	6.82	14.03	6.91	14.14
TOTAL PRODUCTION COST	42.48	87.37	39.56	80.95
RETURN TO CAPITAL	12.96		16.22	
RETURN TO EQUITY	6.14	12.63	9.31	19.05
MILK PRICE	45.18		45.27	
INVENTORY ADJUSTMENT	3.45		3.60	
INTEREST ON EQUITY (%)	11.22		15.75	
INTEREST ON DEBT (%)	9.12		10.82	

TABLE 7:

SOUTHERN ALBERTA AVERAGE
DAIRY ENTERPRISE COSTS AND RETURNS

	Per hL. Sold	Per Cent From Income	Per hL. Sold	Per Cent From Income
	1985		1986	
INCOME:				
Milk Sales	45.86		45.66	
Milk Subsidy	2.14		2.20	
Milk Levies (-)	-2.80		-2.20	
Miscellaneous Receipts	0.95		1.59	
Net Cattle Sales (+-)	3.06		2.22	
Net Inventory Increase (+-)	-0.83		0.08	
Gross Income	48.39	100.0	49.55	100.0
EXPENSES:				
Grain	2.35		1.35	
Complete Feed	5.60		5.90	
Supplement	0.38		0.32	
Minerals & Vitamins	0.12		0.24	
Roughage	10.08		7.63	
Pasture	0.47		0.31	
Processing Costs	0.02		0.03	
Total Feed Costs	19.03	39.32	15.79	31.87
Bedding and Supplies	1.18		1.17	
Vet & Medicine	1.27		1.26	
Milk Hauling	2.42		1.73	
Producer's Fees	--		0.67	
Utilities	1.00		1.03	
Fuel, Oil, Lube	0.73		0.43	
Bldg & Mach Repairs	1.56		1.61	
Taxes & Insurance	0.43		0.54	
Miscellaneous	1.14		1.49	
Dairy Cash	9.73	20.11	9.93	20.05
Hired Labour	2.68		2.37	
Family Labour	4.94		5.32	
Total Labour Costs	7.62	15.75	7.70	15.53
TOTAL OPERATING COSTS	36.38		33.42	
Rent	0.44		0.16	
Depreciation	3.75		3.77	
Interest (Cap. Debt)	2.61		1.87	
Total Capital Costs	6.80	14.05	5.80	11.71
TOTAL PRODUCTION COST	43.18	89.23	39.23	79.16
RETURN TO CAPITAL	12.01		16.13	
RETURN TO EQUITY	5.21	10.77	10.33	20.84
MILK PRICE	45.21		45.66	
INVENTORY ADJUSTMENT	3.18		3.89	
INTEREST ON EQUITY (%)	10.73		17.73	
INTEREST ON DEBT (%)	9.66		9.79	

Returns

The moderate increases in income coupled with decreased cost resulted in significant increases in producer returns in 1986. The return to equity per hectolitre has increased from \$5.74 in 1985 to \$9.73 in 1986. This represents an increase in per cent return to equity from 11.04 per cent in 1985 to 16.57 per cent in 1986. Considering the bank's investment certificate rates or government bonds, the 1986 return on dairy farms was very favourable. However, one should keep in mind that in 1986, dairy producers received feed grain market adjustment benefits as well as drought assistance. These non-milk subsidies accounted for \$2.00 per hectolitre of milk improvements in the return. In their absence, the return to equity would have been 13.1 per cent.

Table 8 also shows how return to equity would change if quota value is included in the assets of the farm. Although the quota value is not included in the analysis for new entrants, the payment for quota is real and the return for these producers was 8.9 per cent.

TABLE 8

RETURN TO EQUITY

	1986 Study	Excluding Indirect Subsidies	Including Quota Value
1. Dairy Investment (\$)	290,654	290,654	473,500
2. Debt (\$)	77,306	77,306	77,306
3. Equity (\$)	213,348	213,348	396,194
4. Equity (\$/hL)	58.77	58.77	109.13
5. Blend Price	45.44	45.44	45.44
6. Other Credits	3.72	2.72	3.72
7. Production Costs	39.43	40.43	39.43
8. Paid Interest	2.22	2.22	2.22
9. Return to Equity	9.73	7.73	9.73
10. % Return ($9 \div 4$)	16.57	13.15	8.92

Table 9 illustrates the acceptable total debt load per cow at various levels of milk production and interest rates. The basic repayment capacity is given by gross return, for example, money available for resource ownership payment, consisting of rent, depreciation, paid and equity interest (\$917 per cow). This table should be used as a guide-line only, each individual situation is different.

TABLE 9

ACCEPTABLE TOTAL DEBT LOAD PER CCW

Milk Production	Interest Rate	10 %	11 %	12 %	13 %	14 %	15 %
4,500 (hL/cow)		5267	4926	4620	4345	4097	3872
5,500		6437	6021	5647	5311	5007	4732
6,000		7021	6567	6160	5793	5461	5161
6,500		7606	7114	6673	6276	5917	5592
7,000		8191	7662	7186	6759	6372	6023

* At 20 Years Repayment Period.

Price Formula Comparison With Cost Study Results

Table 10 compares the 1986 cost study with the results of the formula price. Over the years the composite index of the formula was responsible for an increase of 138 per cent in the Class 1 price, which in turn contributed to the increase in the effective blend price received by the producers. The supply factors of the formula increased for the same period by 147 per cent, while the estimated cost of production increased by 127 per cent.

The results indicate that the change in cost indices used in the formula was slightly higher than the actual cost changes found in the study. This resulted in a higher return on dairy farms in 1986. The return to equity per hectolitre increased over the 1973 base by 95 per cent, but the assets increased almost at the same rate, leaving 16.5 per cent return to equity compared to 15 per cent in 1973.

Two factors in respect to the comparison between cost study and the formula should be mentioned. Namely, the technology change such as increases in milk production over the years, contributed 3 points in the 16.5 return. From Table 3, the equity per farm increased by 135.7 per cent over the 1973 base, however the same value per hectolitre increased by only 92.2 per cent because of the improvements in productivity. Secondly, the short term government assistance contributed another 3 points, or \$2.00 per hectolitre. The continuation of these programs is unknown.

By and large, the formula adequately responded to the downward trend in cost of production in 1986, triggering class 1 milk price downwards three times.

TABLE 10
COMPARISON OF 1986 DAIRY STUDY
RESULTS WITH MILK PRICE FORMULA

	1973 Base	1986 Study	% Change
1. Dairy Investment (\$)	90,513	290,654	220.1
2. Debt (\$)	N/A	77,306	N/A
3. Equity (\$)	90,513	213,348	135.7
4. Equity (\$/hL)	30.58	58.77	92.2
5. Blend Price	19.36	45.44	134.7
6. Other Credits	3.02	3.72	23.2
7. Production Costs	17.39	39.43	126.7
8. Paid Interest	N/A	2.22	N/A
9. Return to Equity	4.99	9.73	95.0
10. % Return (9 ÷ 4)	15	16.5	--
11. Class 1 Price	21.04	50.03	137.8
12. Price Formula Indices	100.00	237.43	137.4
13. Price Formula Supply Indices	100.00	244.55	144.6

Management Profile

Dairy management is concerned with the organizing, planning, directing and supervising of a dairy business. Dairy farmers carry out these functions. In addition, many farmers provide their own labour.

Table 11 provides a cross-section of values of management factors. Estimates for the top 1/3 are given on the first line and the estimates for the bottom 1/3 groups are on the second line. For instance, the top 1/3 group in feeding spent \$1,176 per cow, while the bottom 1/3 group spent only \$646.30 per cow. Milk production per cow for the two groups was 7205 litres and 5945 litres, respectively, and cost of production was 41.79 and 37.77, respectively.

The overall level of management was determined by five factors:

1. Milk production per cow.
2. Total cost per hectolitre of milk.
3. Milk production for hours of work.
4. Feed conversion.
5. Milk production for dollar of investment.

Top 1/3 producers in all five factors were rated 3 and bottom 1/3 were rated 1. The last column in Table 11 indicates a blend of 1 and 3 for each factor, depending on whether that group had more top managers (closer to 3) or not.

Several conclusions can be derived from Table 11. Producers who are relatively new in dairy (4.7 years) have debt/capital ratio of 0.46, while for most established producers (26.8 years) indebtedness was reduced to 17%. The cost and milk production for the top 1/3 management group were better by 8.6 and 9.1 per cent than the provincial average.

TABLE 11
PROFILE OF MANAGEMENT FACTORS FOR
TOP 1/3 AND BOTTOM 1/3 OF PRODUCERS

TOP 1/3 BOTTOM 1/3 AVERAGES FOR:	MILK PRODUC L/COW	TOTAL COST \$/HL	YEARS IN DAIRY	HERD SIZE	INVES. PER COW	DEBT/ CAPITAL RATIO	EQUITY RETURN %	FEED COST \$/COW	LABOUR HR/COW	OVERALL MGMT RATING
MILK PRODUCTION L/COW	7736 5458	38.23 40.93	15.3 13.4	70.3 58.8	6024 4376	0.22 0.28	18.7 12.8	1105.6 812.2	76 72	2.5 1.6
TOTAL COST \$/HL	6273 6832	46.83 33.35	12.8 10.5	59.8 61.7	5208 4733	0.40 0.19	10.3 28.1	1040.8 864.6	85 70	1.2 2.5
YEARS IN DAIRY	6321 6390	41.26 41.07	26.8 4.7	66.9 63.0	5261 4736	0.17 0.46	13.6 23.6	865.4 943.4	81 74	1.9 2.0
HERD SIZE	6602 6697	39.21 39.42	14.8 15.4	86.9 37.4	4999 5082	0.32 0.21	22.5 21.1	894.6 880.4	71 94	2.1 2.0
INVESTMENT PER COW	7322 5924	41.24 37.91	17.1 12.9	68.4 64.0	6718 3791	0.18 0.23	11.2 22.8	1027.5 854.2	78 69	2.1 2.0
DEBT/CAPITAL RATIO	6756 6764	42.73 37.79	9.0 13.8	68.0 57.6	4988 5648	0.53 0.03	19.7 16.0	959.8 907.7	81 78	1.9 2.1
EQUITY RETURN %	7028 6605	35.62 45.49	11.6 15.5	68.7 57.3	4642 5649	0.29 0.30	35.6 2.3	918.7 1026.2	75 86	2.4 1.6
FEED COST \$/COW	7205 5945	41.79 37.77	14.8 14.6	68.2 58.5	5652 5030	0.29 0.23	12.0 19.3	1176.0 646.3	73 82	2.1 2.0
LABOUR HR/COW	7046 6535	42.62 38.67	12.7 13.1	56.5 71.7	5385 5093	0.39 0.29	20.9 19.0	899.2 981.8	102 57	1.7 2.4
OVERALL MANAGEMENT RATING	7281 6025	36.03 44.91	13.1 15.0	68.1 65.0	5305 5243	0.27 0.32	24.9 12.0	973.8 929.9	65 85	3.0 1.0

The top 1/3 and bottom 1/3 group are set by the values in diagonal.
Overall management is rated 1 for the low group and 3 for the high.

APPENDIX A - ALBERTA COMPUTER PRINTOUT

ALBERTA AVERAGE (56)

TABLE 1

***** DAIRY ENTERPRISE COSTS AND RETURNS *****

	TOTAL ENTERPRISE	PER COW	PER HL. SOLD	PERCENT FROM INCOME

INCOME:				
MILK SALES	166201.73	2958.77	45.75	
MILK SUBSIDY	8379.01	149.17	2.31	
MILK LEVIES (-)	-9500.67	-169.13	-2.62	
MISCELLANEOUS RECEIPTS	6230.29	110.91	1.71	
NET CATTLE SALES (+-)	8649.45	153.98	2.38	
NET INVENTORY INCREASE (+-)	-1361.69	-24.24	-0.37	
GROSS INCOME -----	178598.11	3179.45	49.16	100.00
EXPENSES:				
GRAIN	4958.32	88.27	1.36	
COMPLETE FEED	16703.83	297.37	4.60	
SUPPLEMENT	2322.57	41.35	0.64	
MINERALS & VITAMINS	917.94	16.34	0.25	
ROUGHAGE	25566.98	455.15	7.04	
PASTURE	1290.00	22.96	0.36	
PROCESSING COSTS	281.30	5.01	0.08	
TOTAL FEED COSTS -----	52040.94	926.45	14.32	29.14
BEDDING AND SUPPLIES	4319.99	76.91	1.19	
VET. AND MEDICINE	4427.32	78.82	1.22	
MILK HAULING	5900.59	105.04	1.62	
PRODUCER'S FEES	2913.70	51.87	0.80	
UTILITIES	3864.93	68.80	1.06	
FUEL, OIL, LUBE	2086.32	37.14	0.57	
BLDG. & MACH. REPAIRS	7028.39	125.12	1.93	
TAXES AND INSURANCE	2125.04	37.83	0.58	
MISCELLANEOUS	4529.25	80.63	1.25	
DAIRY CASH COSTS -----	37195.51	662.16	10.24	20.83
HIRED LABOR	8704.32	154.96	2.40	
FAMILY LABOR	21918.35	390.20	6.03	
TOTAL LABOR COSTS -----	30622.67	545.15	8.43	17.15
TOTAL OPERATING COSTS	119859.12	2133.76	32.99	
RENT	961.89	17.12	0.26	
DEPRECIATION	14359.21	255.63	3.95	
INTEREST (CAP.DEBT)	8057.42	143.44	2.22	
TOTAL CAPITAL COSTS	23378.52	416.19	6.44	13.09
TOTAL PRODUCTION COST -----	143237.64	2549.96	39.43	80.20
RETURN TO CAPITAL	58738.99	1045.69	16.17	
RETURN TO EQUITY	35360.47	629.50	9.73	19.80
MILK PRICE			45.44	
INVENTORY ADJUSTMENT			3.72	
INTEREST ON EQUITY (%)			16.57	
INTEREST ON DEBT (%)			10.42	

ALBERTA AVERAGE (56)

TABLE 2

***** STATEMENT OF INVESTMENT *****

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.41	4470.93	103374.69
POWER MACHINERY	4.60	3858.38	29352.26
DAIRY EQUIPMENT	5.70	5557.50	30739.84
OTHER EQUIPMENT	5.26	472.35	2660.11
TOTAL EQUIPMENT	5.04	9888.23	62752.22
LAND SUPPLIES			4302.90
			2565.60
** SUBTOTAL **		14359.21	172995.40

DAIRY LIVESTOCK	--BEGIN YEAR-- NUMBER	VALUE	--END OF YEAR-- NUMBER	VALUE	AVERAGE VALUE
COWS	56.80	87908.57	56.89	88046.76	87977.66
BRED HEIFERS	17.75	16862.50	16.46	15541.07	16251.78
OPEN HEIFERS	16.14	8071.43	15.52	7758.93	7915.18
HEIFER CALVES	22.09	4417.86	23.30	4660.71	4539.28
BULL CALVES	7.89	521.49	6.68	441.26	481.38
BULLS	0.46	557.14	0.36	428.57	492.85
** SUBTOTAL **	121.14	118338.99	119.21	116977.30	117658.14
TOTAL DAIRY INVESTMENT					290653.55
CAPITAL LOANS					77305.74
OPERATOR EQUITY					213347.80
INVESTMENT PER COW					5174.29
DEBT/CAPITAL RATIO					0.27
CAPITAL TURNOVER (YR)					1.63

-----HERD SIZE-----

NUMBER OF DAIRY COWS	56.17
NUMBER OF ANIMAL UNITS	88.57
DRY COWS (%)	15.83
CALF CROP (%)	78.74
PASTURE PER COW (AC.)	0.97

ALBERTA AVERAGE (56)

TABLE 3

***** LABOUR AND MANAGEMENT *****

LABOUR -----	HOURS	VALUE	HOURLY RATE	
OPERATOR LABOR	2017.45	16646.50	8.25	
HIRED LABOR	1372.24	8704.32	6.34	
FAMILY UNPAID LABOR	1005.64	5271.85	5.24	
TOTAL	4395.33	30622.67	6.97	
RETURN TO FAMILY LABOR	11.18	\$/HR.		
MAN EQUIVALENTS	1.76			
LABOR HOURS PER COW	78.25			
YEARS FARMING	14.48			
MILK PRODUCTION -----	HL.	% OF TOTAL	VALUE	PRICE
QUOTA MILK	2611.71	69.69	125150.25	47.92
OVER QUOTA MILK	1000.66	26.70	40100.64	40.07
OTHER MILK SALES	18.05	0.48	829.12	45.92
FED TO LIVESTOCK	116.93	3.12	5349.29	45.75
TOTAL	3747.36	100.00	171429.50	45.75
FLUID QUOTA	729.52	LITRES/DAY		
CLASS 1 UTILIZATION	75.45	%		
BUTTERFAT TEST	3.68	KG/HL		
MILK PRODUCTION PER COW	6671.14	LITRES		
MANAGEMENT FACTORS -----				
COST PER HL	39.43			
MILK/FEED (KG) RATIO	2.11	LITRES		
MILK/LABOUR (HR) RATIO	85.26	LITRES		
MILK/CAPITAL (\$) RATIO	1.29	LITRES		

ALBERTA AVERAGE (56)

***** FEED REPORT *****

TABLE 4

CONCENTRATES -----	-----PURCHASED-----			-----HOMEGROWN-----		
	QUANTITY (TONNES)	PRICE	VALUE	QUANTITY (TONNES)	PRICE	VALUE
OATS	1.56	63.17	98.62	4.22	67.04	282.64
BARLEY	15.94	75.78	1207.86	35.53	59.88	2127.83
WHEAT	0.27	69.67	18.66			
MIXED GRAIN	0.80	111.50	89.56	8.06	64.43	519.03
BREW GRAIN (DRY EQ.)	5.02	118.64	594.98			
BET PULP	0.27	70.52	18.74			
STILLAGE (DRY EQ.)		2640.00	0.39			
TOTAL GRAIN	23.85		2028.81	47.80		2929.50
DAIRY RATION	92.85	164.03	15230.98			
CALF FEED	3.28	449.41	1472.85			
SUPPLEMENT	7.92	293.10	2322.57			
SALT	0.61	328.74	199.57			
MINERALS & VITAMINS	1.15	626.44	718.37			
SUBTOTAL -----	129.66		21973.15	47.80		2929.50
ROUGHAGE -----						
ALFALFA HAY	63.49	105.39	6690.64	134.60	76.56	10304.56
ALFALFA PELLETS	0.20	181.53	36.95			
STRAW FED	1.52	43.08	65.62	2.44	26.54	64.65
GREENFEED	1.15	66.34	76.15	11.43	52.53	600.60
SILAGE (DRY EQ.)	4.74	91.86	435.20	102.66	71.04	7292.61
SUBTOTAL -----	71.10		7304.56	251.12		18262.42
PASTURE (AUM.)				129.00		1290.00
GRINDING			281.30			
GRAND TOTAL FEED COSTS -----			29559.02			22481.92
BEDDING STRAW	14.78	38.58	570.23	31.67	26.37	835.33
AV.PRICE: CONCENTRATE	140.32	\$/TONNE				
ROUGHAGE	79.35	\$/TONNE				
FED PER COW: CONCENTRATE	3.16	TONNES				
ROUGHAGE	5.74	TONNES				
% HOME GROWN: CONCENTRATE	26.94	%				
ROUGHAGE	77.93	%				

APPENDIX B - NORTHERN ALBERTA COMPUTER PRINTOUT

DAIRY STUDY 1986 NORTHERN ALBERTA AVERAGE (34)

TABLE 1 ***** DAIRY ENTERPRISE COSTS AND RETURNS *****

	TOTAL ENTERPRISE	PER COW	PER HL. SOLD	PERCENT FROM INCOME

INCOME:				
MILK SALES	156284.12	2916.52	45.81	
MILK SUBSIDY	8140.00	151.91	2.39	
MILK LEVIES (-)	-9986.55	-186.37	-2.93	
MISCELLANEOUS RECEIPTS	6167.47	115.10	1.81	
NET CATTLE SALES (+-)	8540.65	159.38	2.50	
NET INVENTORY INCREASE (+-)	-2417.37	-45.11	-0.71	
GROSS INCOME -----	166728.31	3111.43	48.88	100.00
EXPENSES:				
GRAIN	4681.95	87.37	1.37	
COMPLETE FEED	12338.58	230.26	3.62	
SUPPLEMENT	2991.46	55.83	0.88	
MINERALS & VITAMINS	891.92	16.64	0.26	
ROUGHAGE	22475.06	419.42	6.59	
PASTURE	1319.41	24.62	0.39	
PROCESSING COSTS	389.03	7.26	0.11	
TOTAL FEED COSTS -----	45087.41	841.41	13.22	27.04
BEDDING AND SUPPLIES	4111.27	76.72	1.21	
VET. AND MEDICINE	4053.74	75.65	1.19	
MILK HAULING	5258.59	98.13	1.54	
PRODUCER'S FEES	3078.24	57.45	0.90	
UTILITIES	3705.03	69.14	1.09	
FUEL, OIL, LUBE	2328.68	43.46	0.68	
BLDG. & MACH. REPAIRS	7424.29	138.55	2.18	
TAXES AND INSURANCE	2110.09	39.38	0.62	
MISCELLANEOUS	3636.56	67.86	1.07	
DAIRY CASH COSTS -----	35706.47	666.34	10.47	21.42
HIRED LABOR	8132.98	151.77	2.38	
FAMILY LABOR	22461.25	419.16	6.58	
TOTAL LABOR COSTS -----	30594.23	570.94	8.97	18.35
TOTAL OPERATING COSTS	111388.12	2078.69	32.65	
RENT	1177.71	21.98	0.35	
DEPRECIATION	13943.76	260.21	4.09	
INTEREST (CAP.DEBT)	8455.77	157.80	2.48	
TOTAL CAPITAL COSTS	23577.23	439.99	6.91	14.14
TOTAL PRODUCTION COST -----	134965.35	2518.68	39.56	80.95
RETURN TO CAPITAL	55340.19	1032.74	16.22	
RETURN TO EQUITY	31762.96	592.75	9.31	19.05
MILK PRICE			45.27	
INVENTORY ADJUSTMENT			3.60	
INTEREST ON EQUITY (%)			15.75	
INTEREST ON DEBT (%)			10.82	

TABLE 2

***** STATEMENT OF INVESTMENT *****

LAND BUILDINGS & EQUIPMENT		AGE	DEPRECIATION		DAIRY INVESTMENT

DAIRY BUILDINGS		9.30	4353.72		100614.61
POWER MACHINERY		4.52	3798.93		28937.60
DAIRY EQUIPMENT		5.88	5483.82		30119.84
OTHER EQUIPMENT		7.09	307.29		1603.68
TOTAL EQUIPMENT		5.11	9590.04		60661.11
LAND SUPPLIES					3783.24
					2090.75
** SUBTOTAL **			13943.76		167149.71
DAIRY LIVESTOCK		--BEGIN YEAR----		--END OF YEAR----	
-----		NUMBER	VALUE	NUMBER	VALUE
					AVERAGE VALUE
COWS		55.53	85301.33	54.62	83900.73
BRED HEIFERS		16.62	15786.76	15.38	14613.24
OPEN HEIFERS		14.85	7426.47	15.26	7632.35
HEIFER CALVES		19.85	3970.59	21.56	4311.76
BULL CALVES		9.68	611.89	6.85	433.35
BULLS		0.59	705.88	0.41	494.12
** SUBTOTAL **		117.12	113802.92	114.09	111385.55
TOTAL DAIRY INVESTMENT		-----			279743.95
CAPITAL LOANS					78136.69
OPERATOR EQUITY					201607.26
INVESTMENT PER COW					5220.49
DEBT/CAPITAL RATIO					0.28
CAPITAL TURNOVER (YR)					1.68
-----HERD SIZE-----					
NUMBER OF DAIRY COWS		53.59			
NUMBER OF ANIMAL UNITS		84.93			
DRY COWS (%)		14.98			
CALF CROP (%)		73.77			
PASTURE PER COW (AC.)		0.85			

DAIRY STUDY 1986

NORTHERN ALBERTA AVERAGE (34)

TABLE 3

***** LABOUR AND MANAGEMENT *****

LABOUR -----	HOURS	VALUE	HOURLY RATE	
OPERATOR LABOR	1969.09	16247.68	8.25	
HIRED LABOR	1404.49	8132.98	5.79	
FAMILY UNPAID LABOR	1156.94	6213.53	5.37	
TOTAL	4530.51	30594.23	6.75	
RETURN TO FAMILY LABOR	10.25	\$/HR.		
HAN EQUIVALENTS	1.81			
LABOR HOURS PER COW	84.55			
YEARS FARMING	13.56			
MILK PRODUCTION -----	HL.	% OF TOTAL	VALUE	PRICE
QUOTA MILK	2387.25	67.82	114922.06	48.14
OVER QUOTA MILK	1009.89	28.69	40711.35	40.31
OTHER MILK SALES	13.96	0.40	640.52	45.89
FED TO LIVESTOCK	108.75	3.09	4982.04	45.81
TOTAL	3519.85	100.00	161255.97	45.81
FLUID QUOTA	661.03	LITRES/DAY		
CLASS 1 UTILIZATION	75.45	%		
BUTTERFAT TEST	3.72	KG/HL		
MILK PRODUCTION PER COW	6568.62	LITRES		
MANAGEMENT FACTORS -----				
COST PER HL	39.56			
MILK/FEED (KG) RATIO	2.19	LITRES		
MILK/LABOUR (HR) RATIO	77.69	LITRES		
MILK/COW	1.26	LITRES		

TABLE 4

***** FEED REPORT *****

CONCENTRATES -----	-----PURCHASED-----			-----HOMEGROWN-----		
	QUANTITY (TONNES)	PRICE	VALUE	QUANTITY (TONNES)	PRICE	VALUE
OATS	0.51	47.76	24.49	4.71	65.59	309.01
BARLEY	10.40	78.86	820.30	45.50	58.34	2654.26
WHEAT						
MIXED GRAIN	0.97	90.27	87.35	12.12	63.60	773.45
BREW GRAIN (DRY EQ.)						
BET PULP	0.05	250.08	13.09			
STILLAGE (DRY EQ.)						
TOTAL GRAIN	11.93		945.24	62.34		3736.71
DAIRY RATION	71.82	162.87	11697.71			
CALF FEED	2.70	237.22	640.87			
SUPPLEMENT	10.00	299.13	2991.46			
SALT	0.63	382.13	242.34			
MINERALS & VITAMINS	1.12	579.50	649.59			
SUBTOTAL -----	98.21		17167.20	62.34		3736.71
ROUGHAGE -----						
	QUANTITY (TONNES)	PRICE	VALUE	QUANTITY (TONNES)	PRICE	VALUE
ALFALFA HAY	36.99	88.26	3264.40	160.85	74.04	11909.89
ALFALFA PELLETS	0.34	181.53	60.87			
STRAW FED	0.55	69.00	38.15	3.15	26.43	83.20
GREENFEED	1.04	43.32	44.84	14.58	51.30	748.16
SILAGE (DRY EQ.)	3.58	59.16	211.80	51.59	66.75	6113.75
SUBTOTAL -----	42.49		3620.06	270.17		16855.00
PASTURE (AUM.)						
GRINDING			389.03	131.94		1319.41
GRAND TOTAL FEED COSTS -----			21176.29			23911.12
BEDDING STRAW	8.06	35.89	289.15	40.25	26.55	1068.75
AV.PRICE: CONCENTRATE	130.20	\$/TONNE				
ROUGHAGE	71.88	\$/TONNE				
FED PER COW: CONCENTRATE	3.00	TONNES				
ROUGHAGE	5.83	TONNES				
% HOME GROWN: CONCENTRATE	38.83	%				
ROUGHAGE	66.41	%				

APPENDIX C - SOUTHERN ALBERTA COMPUTER PRINTOUT

DAIRY STUDY 1986 SOUTHERN ALBERTA AVERAGE (22)

TABLE 1 ***** DAIRY ENTERPRISE COSTS AND RETURNS *****

	TOTAL ENTERPRISE	PER COW	PER HL. SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	181528.68	3016.91	45.66	
MILK SUBSIDY	8748.39	145.39	2.20	
MILK LEVIES (-)	-8749.75	-145.42	-2.20	
MISCELLANEOUS RECEIPTS	6327.36	105.16	1.59	
NET CATTLE SALES (+-)	8817.60	146.54	2.22	
NET INVENTORY INCREASE (+-)	332.85	5.53	0.08	
GROSS INCOME -----	197005.14	3274.12	49.55	100.00
EXPENSES:				
GRAIN	5385.47	89.50	1.35	
COMPLETE FEED	23450.25	389.73	5.90	
SUPPLEMENT	1288.91	21.42	0.32	
MINERALS & VITAMINS	958.17	15.92	0.24	
ROUGHAGE	30345.43	504.32	7.63	
PASTURE	1244.55	20.68	0.31	
PROCESSING COSTS	114.82	1.91	0.03	
TOTAL FEED COSTS -----	62787.59	1043.50	15.79	31.87
BEDDING AND SUPPLIES	4642.55	77.16	1.17	
VET. AND MEDICINE	5004.68	83.18	1.26	
MILK HAULING	6892.77	114.55	1.73	
PRODUCER'S FEES	2659.41	44.20	0.67	
UTILITIES	4112.04	68.34	1.03	
FUEL, OIL, LUBE	1711.77	28.45	0.43	
BLDG. & MACH. REPAIRS	6416.54	106.64	1.61	
TAXES AND INSURANCE	2148.14	35.70	0.54	
MISCELLANEOUS	5908.86	98.20	1.49	
DAIRY CASH COSTS -----	39496.76	656.41	9.93	20.05
HIRED LABOR	9440.87	156.90	2.37	
FAMILY LABOR	21155.77	351.60	5.32	
TOTAL LABOR COSTS -----	30596.63	508.50	7.70	15.53
TOTAL OPERATING COSTS	132880.98	2208.41	33.42	
RENT	628.36	10.44	0.16	
DEPRECIATION	15001.27	249.31	3.77	
INTEREST (CAP.DEBT)	7441.79	123.68	1.87	
TOTAL CAPITAL COSTS	23071.42	383.43	5.80	11.71
TOTAL PRODUCTION COST -----	155952.41	2591.84	39.23	79.16
RETURN TO CAPITAL	64124.16	1065.71	16.13	
RETURN TO EQUITY	41052.73	682.27	10.33	20.84
MILK PRICE			45.66	
INVENTORY ADJUSTMENT			3.89	
INTEREST ON EQUITY (%)			17.73	
INTEREST ON DEBT (%)			9.79	

TABLE 2

***** STATEMENT OF INVESTMENT *****

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.56	4652.20	107639.66
POWER MACHINERY	4.73	3950.26	29988.58
DAIRY EQUIPMENT	5.45	5671.37	31698.02
OTHER EQUIPMENT	4.15	727.44	4278.86
TOTAL EQUIPMENT	4.94	10349.07	65965.47
LAND SUPPLIES			5106.02
			3299.47
** SUBTOTAL **		15001.27	182010.62

DAIRY LIVESTOCK	--BEGIN YEAR-- NUMBER	---- VALUE	--END OF YEAR-- NUMBER	---- VALUE	AVERAGE VALUE
COWS	58.77	91995.33	60.41	94556.70	93276.02
BRED HEIFERS	19.50	18525.00	18.14	17229.53	17877.27
OPEN HEIFERS	18.14	9068.18	15.91	7954.55	8511.36
HEIFER CALVES	25.55	5109.09	26.00	5200.00	5154.54
BULL CALVES	5.14	361.88	6.41	451.55	405.71
BULLS	0.27	327.27	0.27	327.27	327.27
** SUBTOTAL **	127.36	125386.75	127.14	125719.60	125553.18

TOTAL DAIRY INVESTMENT	307563.79
CAPITAL LOANS	76021.58
OPERATOR EQUITY	231542.21
INVESTMENT PER COW	5111.54
DEBT/CAPITAL RATIO	0.25
CAPITAL TURNOVER (YR)	1.56

-----HERD SIZE-----	
NUMBER OF DAIRY COWS	60.17
NUMBER OF ANIMAL UNITS	94.18
DRY COWS (%)	17.02
CALF CROP (%)	85.59
PASTURE PER COW (AC.)	1.13

DAIRY STUDY 1986

SOUTHERN ALBERTA AVERAGE (22)

TABLE 3

***** LABOUR AND MANAGEMENT *****

LABOUR -----	HOURS	VALUE	HOURLY RATE
OPERATOR LABOR	2092.18	17262.87	8.25
Hired LABOR	1322.41	9440.87	7.14
FAMILY UNPAID LABOR	771.82	3092.89	5.04
TOTAL	4186.41	30596.63	7.31
RETURN TO FAMILY LABOR	12.83	\$/HR.	
MAN EQUIVALENTS	1.67		
LABOR HOURS PER COW	69.58		
YEARS FARMING	15.91		
MILK PRODUCTION -----	HL.	% OF TOTAL	VALUE PRICE
QUOTA MILK	2958.59	72.18	140957.37 47.64
OVER QUOTA MILK	986.40	24.06	39157.32 39.70
OTHER MILK SALES	24.38	0.59	1120.40 45.95
FED TO LIVESTOCK	129.58	3.16	5916.59 45.66
TOTAL	4098.96	100.00	187151.68 45.66
FLUID QUOTA	835.36	LITRES/DAY	
CLASS 1 UTILIZATION	75.45	%	
BUTTERFAT TEST	3.61	KG/HL	
MILK PRODUCTION PER COW	6812.25	LITRES	
MANAGEMENT FACTORS -----			
COST PER HL	79.23		
MILK/FEED (KG) RATIO	2.01	LITRES	
LABOR/FEED (HR) RATIO	97.91	LITRES	
MILK/CAPITAL (\$) RATIO	1.33	LITRES	

TABLE 4

***** FEED REPORT *****

CONCENTRATES -----	-----PURCHASED-----			-----HOMEGROWN-----		
	QUANTITY (TONNES)	PRICE	VALUE	QUANTITY (TONNES)	PRICE	VALUE
OATS	3.18	67.00	213.18	3.45	70.11	241.90
BARLEY	24.50	73.75	1806.82	20.13	65.30	1314.29
WHEAT	0.68	69.67	47.50			
MIXED GRAIN	0.55	169.30	92.96	1.77	71.08	125.85
BREW GRAIN (DRY EQ.)	12.77	118.64	1514.50			
BET PULP	0.60	46.13	27.47			
STILLAGE (DRY EQ.)		2640.00	1.00			
TOTAL GRAIN	42.27		3703.44	25.35		1682.03
DAIRY RATION	125.36	165.06	20691.53			
CALF FEED	4.17	662.04	2758.72			
SUPPLEMENT	4.72	273.33	1288.91			
SALT	0.57	236.19	133.48			
MINERALS & VITAMINS	1.19	694.96	824.69			
SUBTOTAL -----	178.26		29400.76	25.35		1682.03
ROUGHAGE -----						
	QUANTITY (TONNES)	PRICE	VALUE	QUANTITY (TONNES)	PRICE	VALUE
ALFALFA HAY	104.44	114.76	11985.73	94.03	83.21	7823.62
ALFALFA PELLETS						
STRAW FED	3.02	35.76	108.08	1.34	26.95	35.99
GREENFEED	1.32	94.21	124.53	6.56	56.76	372.54
SILAGE (DRY EQ.)	6.53	119.57	780.45	119.75	76.11	9114.48
SUBTOTAL -----	115.31		12998.80	221.68		17346.64
PASTURE (AUM.)				124.45		1244.55
GRINDING			114.82			
GRAND TOTAL FEED COSTS -----			42514.37			20273.21
BEDDING STRAW	25.18	39.91	1004.64	18.42	25.77	474.59
AV.PRICE: CONCENTRATE	152.66	\$/TONNE				
ROUGHAGE	90.05	\$/TONNE				
FED PER COW: CONCENTRATE	3.38	TONNES				
ROUGHAGE	5.60	TONNES				
% HOME GROWN: CONCENTRATE	12.45	%				
ROUGHAGE	65.78	%				

APPENDIX D - MONTHLY QUESTIONNAIRE

DAIRY STUDY MONTHLY QUESTIONNAIRE

Name: _____ Month: _____ Year: 1986

ALL INDIVIDUAL ACCOUNTS WILL BE KEPT CONFIDENTIAL.

Use your own actual situation and experience to estimate proportions to dairy as indicated. The dairy enterprise means everything associated with milking and dry cows and dairy young stock. It is important that the information be provided each month. Your milk production, values, and CDC Subsidy are obtained from the milk statements by this office.

Question	Total Farm	Dairy Portion
1. <u>Litres</u> of Milk sold other than to plant	_____	_____
2. Value of milk sold other than to plant	_____	_____
3. <u>Litres</u> of milk fed to young stock (not colostrum)	_____	_____
4. <u>Litres</u> of milk used in home	_____	_____
5. Veterinary, medicine and breeding expenses	_____	_____
6. Livestock and dairy supplies	_____	_____
7. Hardware, Building and fence repairs	_____	_____
8. Dairy equipment - repairs	_____	_____
9. Field equipment - repairs	_____	_____
10. Tractor, Truck - repairs (Estimate dairy portion _____ %)	_____	_____
11. Fuel, oil, grease (Estimate dairy portion _____ %)	_____	_____
12. Utilities (Estimate dairy portion _____ %)	_____	_____
13. Taxes paid this month	_____	_____
14. Cash rent paid this month for: _____	_____	_____
15. Insurances and Licenses (Dairy _____ %)	_____	_____
16. Interest only on <u>Operating Loans</u> (Dairy Portion _____ %)	_____	_____
17. Seed and Crop supplies (twine etc.)	_____	_____
18. Fertilizer and chemicals	_____	_____
19. Custom charges and other services for: _____	_____	_____
20. Miscellaneous Expenses (DHIA, Legal, Acct. etc.)	_____	_____
21. Feed Purchases	_____	_____
22. Feed grinding Charges	_____	_____
23. INCOME		
a) <u>Other</u> Government Subsidies	_____	_____
b) C.W.B. Payment	_____	_____
c) Crop Sales	_____	_____
d) Misc. Income, specify: _____	_____	_____

24. Labour Situation this Month:

	Dairy Chores			Other Work			Wages Paid incl. Board	
a. Operator Hr./day	_____	x	_____ days	Hr/day	_____	x	_____ days	
b. Hired 1st Hours	_____	x	_____ days	Hours	_____	x	_____ days	_____
and								
Paid 2nd Hours	_____	x	_____ days	Hours	_____	x	_____ days	_____
Family								
3rd Hours	_____	x	_____ days	Hours	_____	x	_____ days	_____
c. Unpaid 1st Hours	_____	x	_____ days	Hours	_____	x	_____ days	
Labor								
2nd Hours	_____	x	_____ days	Hours	_____	x	_____ days	

25. Dairy Herd	Begin. No.	Sold No. Value	Purchased No. Value	Home Use No. Value	Trans. to Beef No. Value	Born No.	Death No.	End No.
Cows Milking								
Cows Dry								
Bred Heifers								
Open Heifers								
Heifer Calves Under 12 mon.								
Bull Calves Under 7 mon.								
Herd Bulls								
TOTALS								

26. Other Livestock (beef, etc.): Sold \$ _____ Purchased \$ _____ Home Use \$ _____

27.	Purchased Feed Price Quantity	Homegrown Feed Quantity	Purchased Feed Price Quantity
Barley			Dairy Ration
Oats			Supplement
Wheat			Calf Feed
Mix. Grain			Salt
Hay			Min. & Vit.
Silage			Brew Grain
Greenfeed			Beet Pulp
Straw fed			Stillage
Bed. Straw			Alf. Pellets
Other			

28. Pasture: Cows _____ Heifers _____ Calves _____

	Total Farm	Dairy Portion
29. Dairy equipment: a. purchases (specify: _____)	_____	_____
b. sales (specify: _____)	_____	_____
30. Field equipment: a. purchases (specify: _____)	_____	_____
b. sales (specify: _____)	_____	_____
31. Tractor, truck, auto. a. purchases (specify: _____)	_____	_____
b. sales (specify: _____)	_____	_____
32. a. Total cost for new bldg. (specify: _____)	_____	_____
b. Buildings sold this month (specify: _____)	_____	_____
33. Land: sold _____ acres, purchased _____ acres	_____	_____
34. Milk Quota: sold _____ L purchased _____ L	_____	_____

APPENDIX E - ALBERTA MILK PRICE FORMULA

Milk sold for consumption in fluid form in Alberta is priced at the producer, wholesale and retail levels by the Public Utilities Board. This is a common procedure in that, for many years, appointed bodies in Canada and the U.S.A. have issued pricing orders designed to ensure adequate supplies of milk for the consuming public. The orders are made following public hearings at which producers, consumer and industry representatives make submission. All systems incorporate some type of quota allocation among milk producers which, when associated with the first grade milk price, provides the incentive to maintain the flow of milk in the cold winter months as well as in the summer.

Formula Pricing

A modification of the above procedure is known as "formula pricing", whereby an equitable price for first grade milk is determined through the use of selected statistical indicators. As milk is considered an essential food in the modern diet, the interests of consumers as well as producers must be considered in the pricing mechanism. Thus an "economic formula", incorporating supply and demand components, is normally used to determine the producer price.

Formula Development in Alberta

In 1973, the Production & Resource Economics Branch designed a formula process to permit a comparison with milk price levels over the previous ten years. It was adopted for experimentation over a 12 month period from August, 1973 to August, 1974. Upon presentation and discussion of the results at a hearing in Red Deer in August 1974, the Public Utilities Board ordered the Formula to be used as a pricing mechanism for a test period of one year starting in October, and to be accompanied with a cost of production program to monitor its suitability and to assess adjustments in the formula components if required at the end of the period.

The Alberta Formula

The Alberta Formula consists of seven statistical factors or components. The first five represent the producer's major cost components and return, and therefore are a reflection of his willingness to sell. The last two represent the approximation of demand of the consumers. The weight given to each factor was established with reference to the actual cost structure on the supply side and relative demand elasticities was a guide for setting the weight of the demand side.

TABLE 1
Components of the Alberta Formula

Components	Weighting
1. Price of 16% dairy feed \$/Tonne (Alberta)	14
2. Price of Alfalfa Hay \$/Ton (Alberta)	14
3. Index of Farm Wages (Western Canada)	12
4. Index of Farm Inputs (Western Canada)	20
5. Index of Consumer Prices (Canada)	10
6. Average Weekly Industrial Wages (Alberta)	16
7. Per Capita Sales of Milk Litres/Month (Alberta)	14
COMPOSITE	100

Application

A base price of \$21.04 per hectolitre for No. 1 milk was established as at August, 1973. This was determined from the results of the 1973 Dairy Cost Study and provided for a return of 15 per cent on sales income. The indices for the month of August, 1973 were converted to 100, which was then equated to the base price of \$21.04. Subsequent monthly index conversions were then calculated relative to the base month, and subsequent monthly producer price levels were determined by multiplying the base price by the appropriate "combined indices".

Whenever the present Formula states a change of \$0.49 per hL above or below the existing No. 1 producer price, the Public Utilities Board may make an adjustment of \$0.98 to the producer and one cent per litre to the consumer.

Changes in the Formula price are calculated monthly by the Production & Resource Economics Branch and are forwarded to the Public Utilities Board in time to allow for notifications and price list adjustment by the milk processing firms for the succeeding month.

The current formula will be kept under observation and, subject to results of the cost study and observed statistical trends, will be reviewed from time to time.